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Remarks

Entry of the above-noted amendments, reconsideration of the application, and allowance of all claims pending are respectfully requested. By this amendment, claims 1-3, 6, 13-15, 28-30, and 33 are amended and claims 34-37 are added. These amendments to the claims constitute a bona fide attempt by applicant to advance prosecution of the application and obtain allowance of certain claims, and are in no way meant to acquiesce to the substance of the rejections. Support for the amendments can be found throughout the specification (e.g., page 9, line 14 to page 11, line 7), figures, and claims (e.g., claims 7-8 and 11-13) and thus, no new matter has been added. Claims 1-37 are pending.

Allowable Subject Matter:

Claims 7-13 were objected to as being dependent upon rejected base claim 1, but were indicated as allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicant gratefully acknowledges this indication of allowability, and is merely deferring the rewriting of claims 7-13 in independent form, pending a determination of patentability of base claim 1.

Claims 22-27 were objected to as being dependent upon rejected base claim 14, but were indicated as allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicant gratefully acknowledges this indication of allowability, and is merely deferring the rewriting of claims 22-27 in independent form, pending a determination of patentability of base claim 14.

Claim Rejections - 35 U.S.C. §§ 102 and 103

Claims 1-3, 14-16, and 28-30 were rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Hall (U.S. Patent No. 6,122,057; "Hall '057"). Claims 4-6, 17-21, and 31-33 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Hall '057. This rejection is respectfully, but most strenuously, traversed.

It is well-settled that there is no anticipation unless (1) all the same elements are (2) found in exactly the same situation and (3) are united in the same way to (4) perform the identical function. Since the Office Action's citations to each of the applied references is missing at least one element of each of applicant's independent claims, applicant respectfully submits that the claimed invention is not anticipated by the Office Action's citations to the applied references, as further discussed below.

For explanatory purposes, applicant discusses herein one or more differences between the Office Action's citations to the applied reference and the claimed invention with reference to one or more parts of the applied reference. This discussion, however, is in no way meant to acquiesce in any characterization that one or more parts of the Office Action's citations to the applied reference correspond to the claimed invention.

Applicant respectfully submits that the Office Action's citations to the applied reference does not teach or suggest one or more elements of the claimed invention. A careful reading of the Office Action's citations to the applied reference fails to teach or suggest, for example, calculating the phase angle ϕ substantially independently of the demodulation phase offset β , as recited in applicant's independent claim 1.

Hall '057 discloses:

A plot of these functions with modulation depth β set to 1.3 radians and period T set to 328 ns is shown in FIG. 2. (column 5, lines 45-46)

The modulation depth β has been set to the relatively small value of 1.3 radians to obtain the appropriate characteristics. For an external phase modulator

$$\beta = 2\pi\theta_p \left(\frac{\tau}{T} \right)$$

where θ_p is the zero to peak phase shift for the modulator, π is the time delay for the mismatched interferometer sensor, and T is the period of the phase generated carrier... (column 6, lines 50-59)

Hall '057 discloses setting the modulation depth β to 1.3 radians to obtain appropriate characteristics. Hall '057 further discloses calculation of a phase angle ϕ (column 5, lines 9-10; equation (13)):

From Eqs. (9)-(12), the tangent of the phase change is calculated as

$$\tan \phi = \left[\frac{1}{R} \right] \left[\frac{Q}{I} \right]$$

Referring to equations (9) and (10) of Hall '057, Q and I are calculated from S_1 , S_2 , S_3 , and S_4 , which are calculated by integrating $e(t)$ and $o(t)$ (column 4, lines 11-24; equations (5), (6), (7), and (8)):

Using capital letters to denote integrated outputs, we obtain

$$S_1 = A + E_1 \cos \phi + O_1 \sin \phi$$

and

$$S_3 = A + E_1 \cos \phi - O_1 \sin \phi$$

where S_1 is the integrated output of $s(t)$ and S_3 is the integrated output of $s \left\{ t + (2n+1) \frac{T}{2} \right\} \dots$

$$S_2 = A + E_2 \cos \phi + O_2 \sin \phi$$

and

$$S_4 = A + E_2 \cos \phi - O_2 \sin \phi.$$

Referring to equations (1)-(4) of Hall '057, $s(t)$ and $s\left\{t + (2n+1)\frac{T}{2}\right\}$ are calculated from

$e(t)$ and $o(t)$, which are calculated from β :

$$e(t) = b \cos \left\{ \beta \sin 2\pi \left(\frac{t}{T} \right) \right\}$$

$$o(t) = b \sin \left\{ \beta \sin 2\pi \left(\frac{t}{T} \right) \right\}$$

Hall '057 discloses calculation of the phase angle using equations that are dependent on the phase offset β . Simply missing from the Office Action's citation to Hall '057 is any mention of calculating the phase angle ϕ substantially independently of the demodulation phase offset β , as recited in applicant's independent claim 1.

So, the Office Action's citation to Hall '057 fails to satisfy at least one of the limitations recited in applicant's independent claim 1.

Furthermore, the Office Action does not allege that the art of record provides any teaching, suggestion, or incentive for modifying the citation to Hall '057 to provide the claimed approach.

For all the reasons presented above with reference to claim 1, claims 1, 14, and 28 are believed neither anticipated nor obvious over the art of record. The corresponding dependent claims are believed allowable for the same reasons as independent claims 1, 14, and 28, as well as for their own additional characterizations.

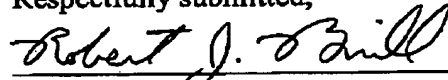
Withdrawal of the §§ 102 and 103 rejections is therefore respectfully requested.

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In view of the above amendments and remarks, allowance of all claims pending is respectfully requested. If a telephone conference would be of assistance in advancing the prosecution of this application, the Examiner is invited to call applicant's attorney.

Respectfully submitted,



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